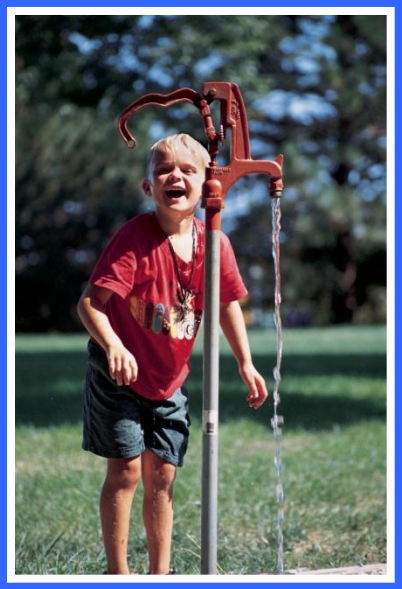


Public Health: Protecting Your Community's Drinking Water Supply

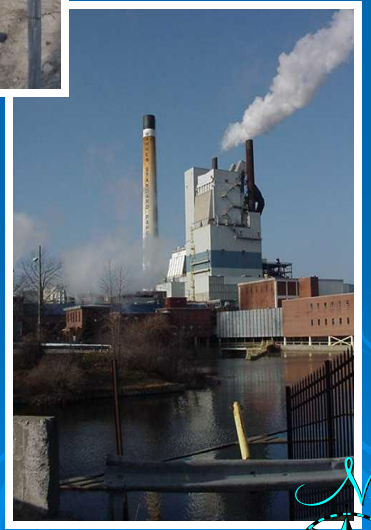
Do we still have waterborne disease from drinking water in the US?

A study[1] of US data from January 2003 to December 2004 found 30 waterborne disease and outbreak incidents associated with drinking water. An estimated 2,760 people became ill and 4 died.

[1]Liang JL, Dziuban EJ, Craun GF, Hill V, Moore MR, Gelting RJ, Calderon RL, Beach MJ, Roy SL. "Surveillance for waterborne disease and outbreaks associated with drinking water and water not intended for drinking, United States, 2003-2004", Surveillance Summaries, MMWR, 2006; 55:31-58.

Local Health Officials can help prevent waterborne disease by becoming involved in efforts to prevent the contamination of drinking water.

There are many natural and human-made pollutants that can contaminate drinking water and cause illness.



This section will cover:

I. Water Supplies 101

II. Drinking Water Contamination
- Typical drinking water contaminants
- Impact on humans
- Where the contaminants come from

III. Examples of Contaminated Water Supplies

IV. Private Wells

V. What You Can Do To Help

But first…

where does your drinking water come from?

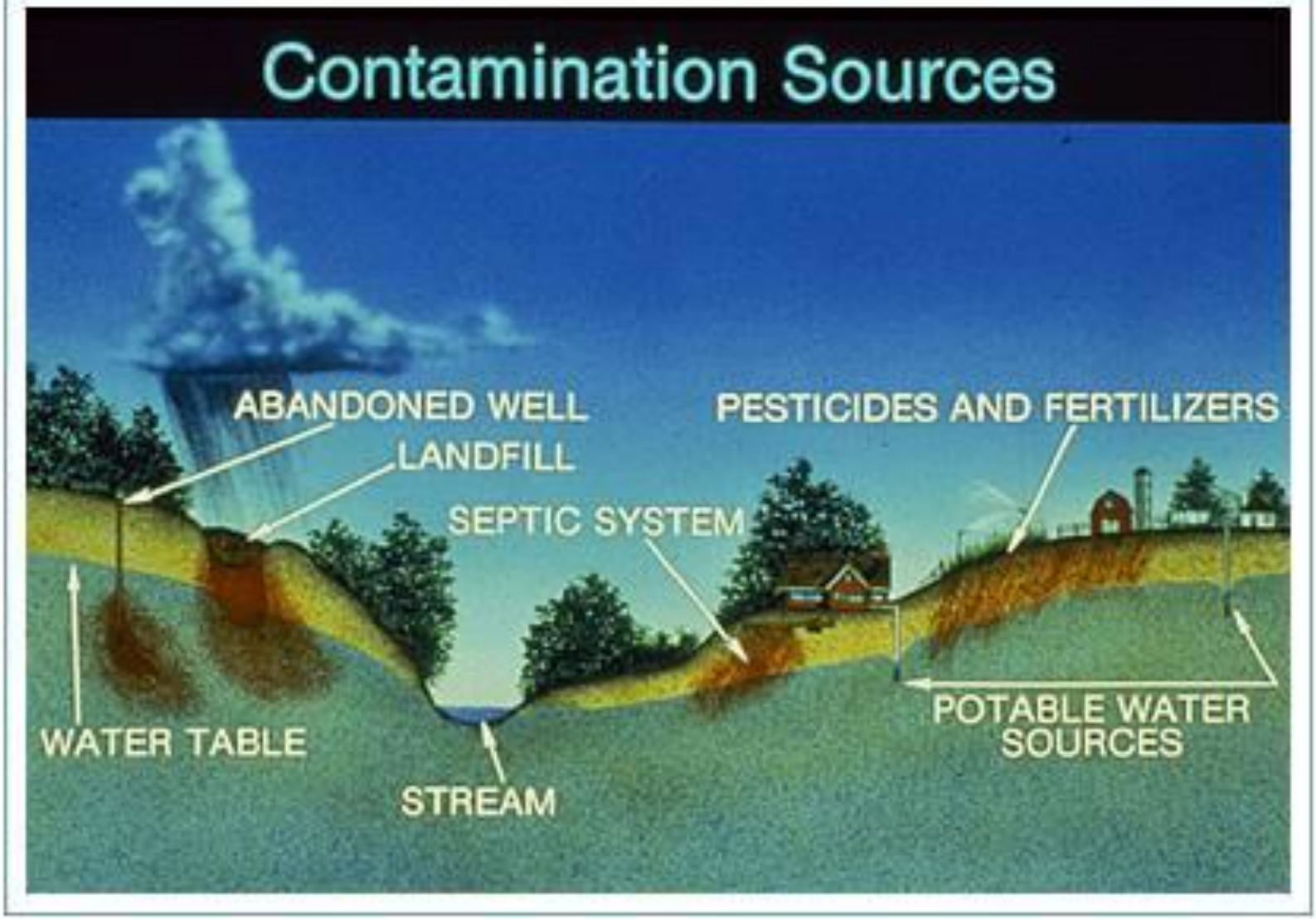
Drinking water can come from:

- Ground water, which is accessed by a well

- Or surface water (a lake, river or stream), which is accessed by an intake.

Contact your local public water supplier for information on your community's source.

Where is the area of concern?



EPA.gov

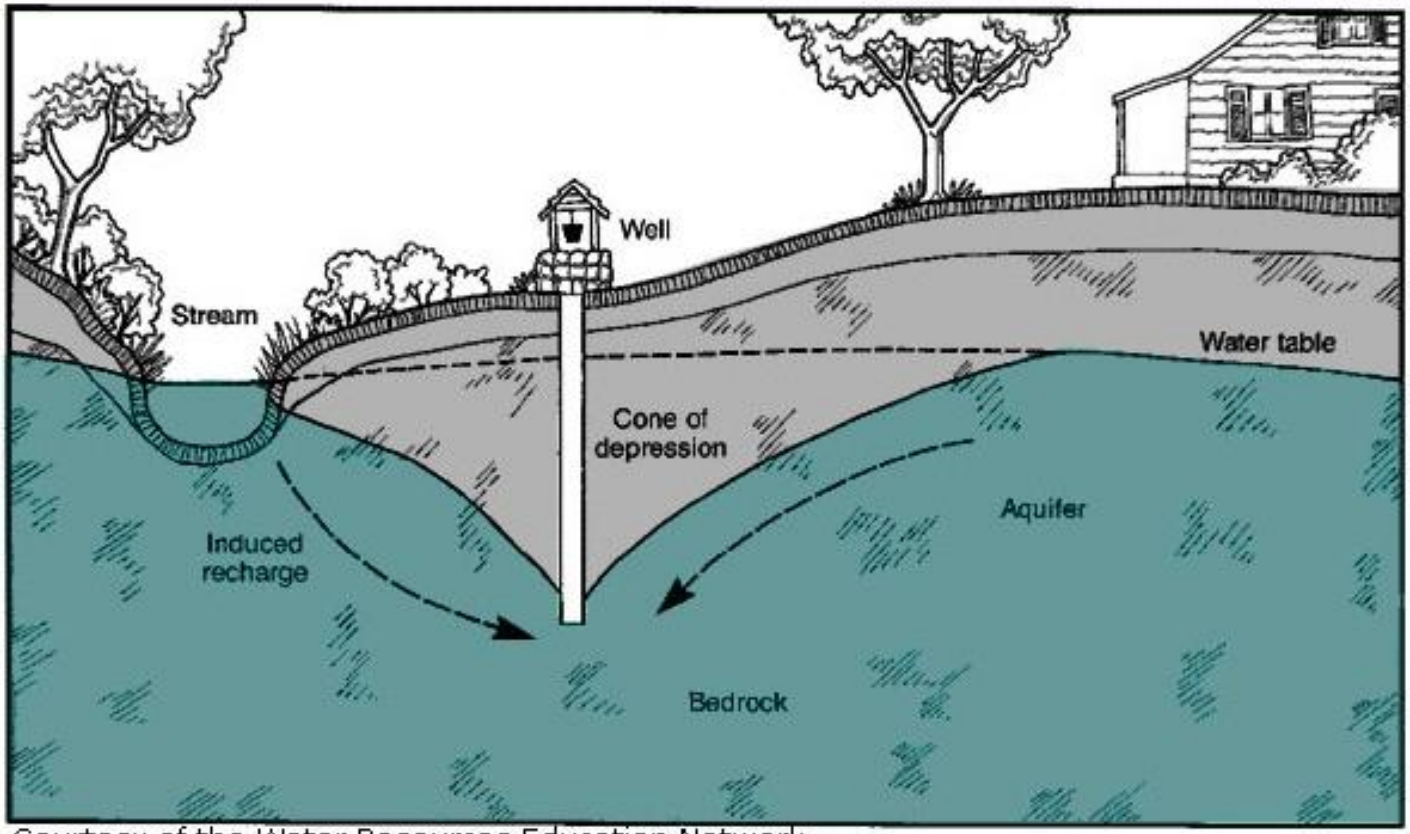
The water supply protection area, or "Source Water Protection Area" is defined as…

"…an area that contributes recharge water to a surface water intake or public water supply well for a public drinking water supply."

Title 30-A MRSA § 2001

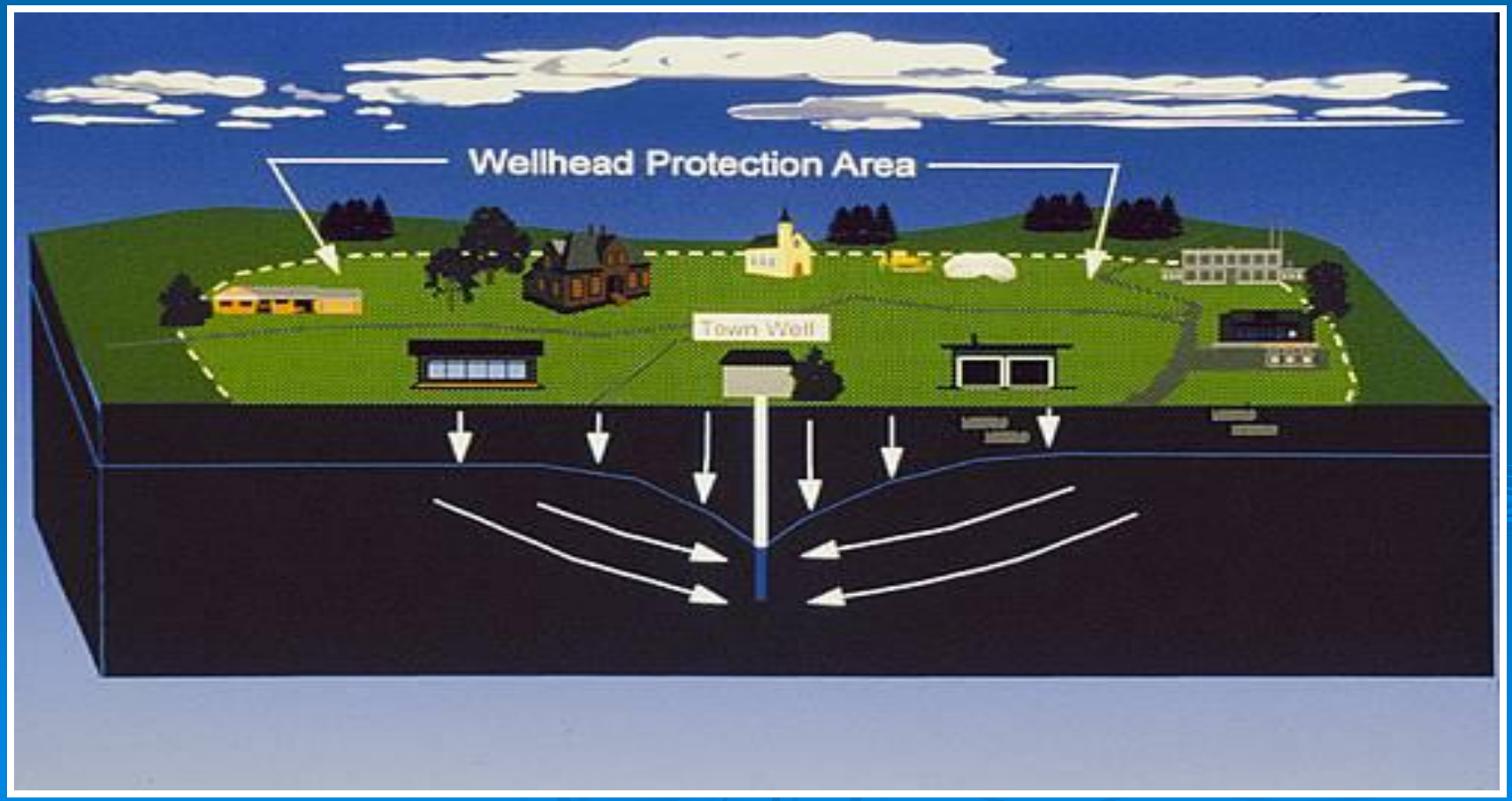
For groundwater supplies, the "Source Water Protection Area" can also be called the "Well Head Protection Area".

When a water well is pumped, water from adjacent areas flows to the well.



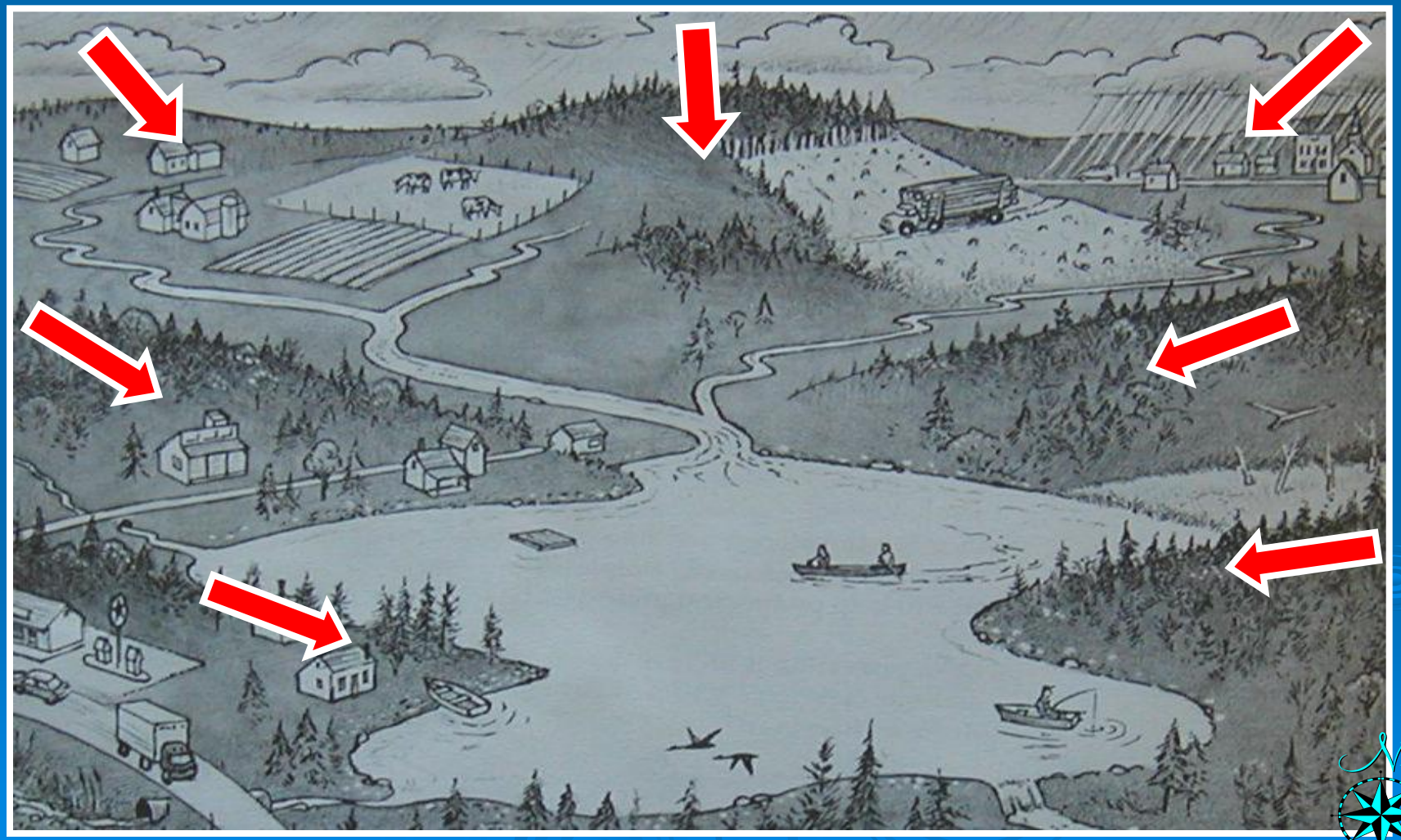
Courtesy of the Water Resources Education Network

Large quantities of water may be pumped for a public water supply well. In these cases the source water protection area (or well head protection area) can be large.

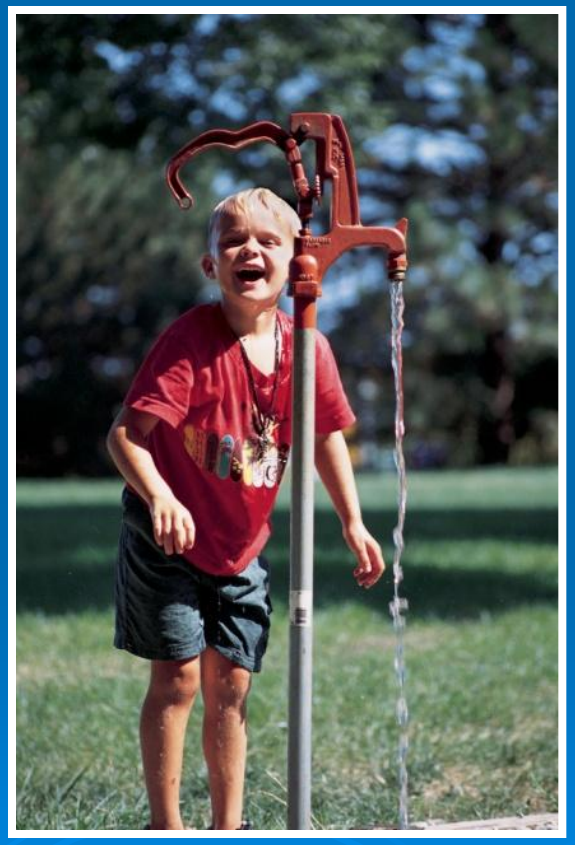


EPA.gov

For a surface water supply, the source water protection area is the land area draining to the waterbody.



I. Water Supplies 101



Maine has over 2,000 public water systems serving over 800,000 people every day.

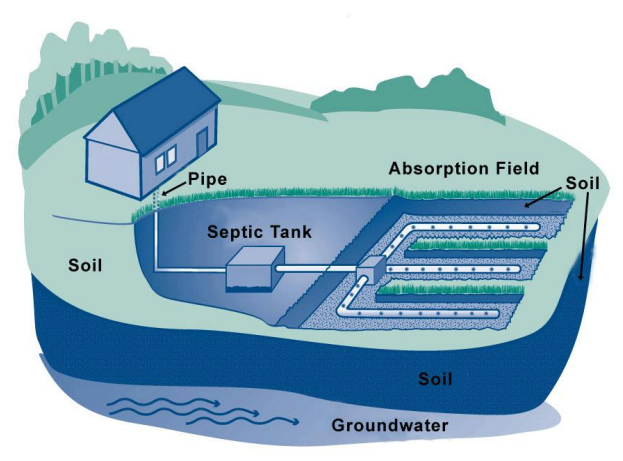
Half of Maine's people depend on private wells for their water supply.

II. Typical drinking water contaminants, their impact on humans and where the contaminants come from

Typical drinking water contaminants:

1. Nitrate
2. Pathogens
3. Chemicals and Toxic Materials

Nitrate – What is it?



Epa.gov

- Water soluble nutrient
- Found in human and animal waste, and fertilizer

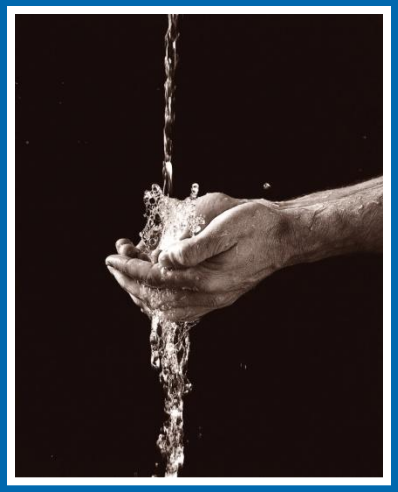
Whirling Phoenix via Flickr

Nitrate – Human Impact

- Can cause "Blue Baby Syndrome" or methemoglobinemia
- Occurs in infants less than six months old
- Due to nitrate exposures of 10 mg/l or greater
- Can result in coma or death

Epa.gov

Nitrate – Where you may find it



Downgradient of:

- Malfunctioning septic systems
- Leaking sewer lines
- Livestock operations
- Manure piles
- Recently fertilized fields and lawns

Pathogens – What are they?

- Microorganisms that cause illness in humans and/or animals

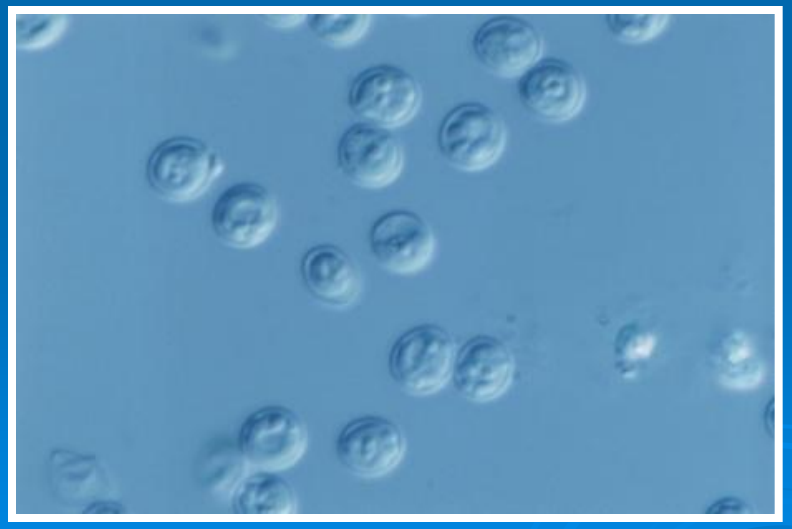
Giardia lamblia

- Examples:
  - Bacteria: E. Coli and Shigella
  - Viruses: Norwalk virus
  - Parasites: Giardia and Cryptosporidium
  - Fungi
  - Protozoa
  - Cysts

Cryptosporidium

Pathogens – Human Impact

Acute gastrointestinal distress, cramping, may cause vomiting and/or diarrhea, may result in death



Cryptosporidium

Giardia lamblia

Pathogens – Human Impact

Certain populations, such as children, seniors and those with compromised immune systems are more vulnerable to pathogens.

Pathogens – Where you may find them

Pathogens are found:

- On and in infected humans and animals
- In and downgradient of bathing areas*
- In surface waters after a rainfall event*
- Downgradient of malfunctioning septic systems and/or sewer lines

* Surface water supplies only

Chemicals and Toxic Materials – What are they?

There is a variety of commonly used chemicals and toxic materials. The list includes:

- Petroleum products
- Lawn and garden chemicals
- Paints and paint thinners
- Household Chemicals
- Photographic chemicals
- Swimming pool chemicals
- Degreasers
- Refrigerants
- Roofing tar
- Battery acid
- And many more…

Please refer to "Wellhead Protection: A Guide For Small Communities" (EPA 625/R-93/002) for a more complete list.

Chemicals and Toxic Materials – Human Impact

Neurological and reproductive damage, effects on growth and development, birth defects, endocrine disruption, cancer, and other adverse effects

Chemicals and Toxic Materials – Where you may find them

"Point source" pollution is from a single identifiable localized source, like a factory, treatment plant, landfill, incinerator, boat yard, airport, chemical manufacturer, salt or sand/salt pile (road deicers), junkyard, gas and/or service station, etc.

gregschuler via Flickr

Jeffdalt via Flickr

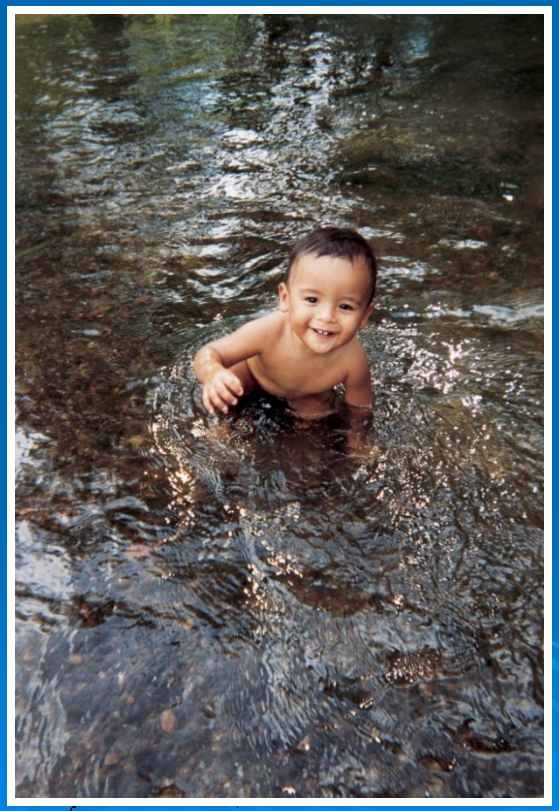
Chemicals and Toxic Materials – Where you may find them

"Nonpoint source" pollution is from the combined impacts of many diffuse sources – like the daily activities of all of us.

Nathan Rein via Flickr

franknorquay via Flickr

III. Examples of Contaminated Water Supplies



Milwaukee, WI 1993

- Caused by Cryptosporidium from soil erosion
- 403,000 residents sickened
- More than 100 died
- CDC estimates $31 million in medical costs
- $64 million in lost productivity
- $11 million in treatment upgrades
- Filtered surface water system

Walkerton, Ontario, Canada 2000

- Caused by heavy rain, manure, E. coli and a cracked well casing
- Rural community, population ~5,000
- 2300 people sickened, 7 died
- CNN reported a total cost of $155 million
- Each household spent ~$4,000
- $1.1 million total decrease in local property values

IV. Private Wells

Water quality in private wells is not regulated in Maine. In addition to nitrate, pathogens and chemicals/toxic materials, arsenic and uranium can be present in private wells. For more information on private wells, go to:

http://wellwater.maine.gov

V. What you can do to help

What you can do...

1. Support local policy that protects the public drinking water source, including:
   - Comprehensive Planning that identifies and protects the source protection area; and
   - A Source (or Well Head) Protection Ordinance.

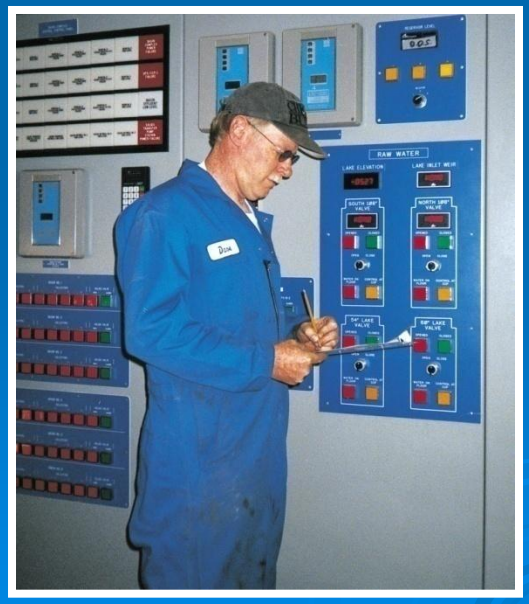
What you can do...

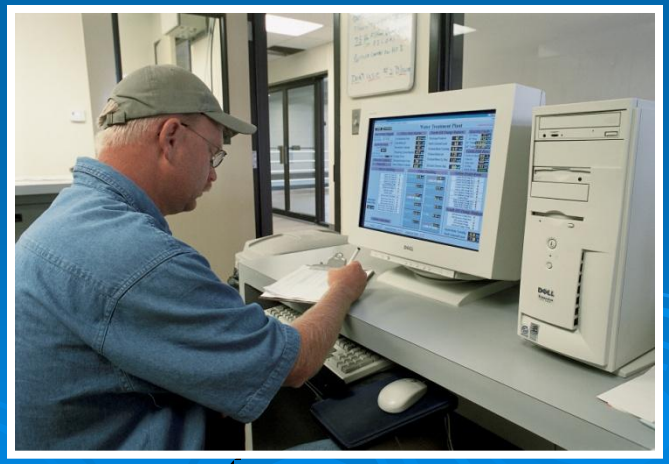
2. Increase public awareness of drinking water protection by:

- Telling the members of your community where the source protection area is located; and
- Working with property owners in the source protection area to decrease potential contaminants.

What you can do…

3. Maintain frequent communication with your local public water supplier(s) regarding potential threats.





Resources

- Your local public water supplier
- The Maine CDC Drinking Water Program at 207.287.2070 or www.maine.gov/dhhs/eng/water
- Maine well water safety links: wellwater.maine.gov

Your Community Thanks You!